

REMARKS

Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow. After amending the claims as set forth above, claims 1-5 and 7-24 are now pending in this application.

Applicants wish to thank the Examiner for the careful consideration given to the claims.

Rejection of claims 1-5 and 7-24 based on 35 U.S.C. 112

Claims 1-5 and 7-24 are rejected under 35 U.S.C. 112, first paragraph, for allegedly failing to comply with the written description requirement because “[n]o support can be found anywhere in the instant disclosure nor do the applicants state where supposed support can be found for” the negative limitation of “a holder member clamping the inner annular bulk metal member without clamping the porous metal plate.” Claim 1 has been amended to remove the phrase “without clamping” and to recite “a holder member clamping the inner annular bulk metal member, apart from the porous metal plate.” Support for this feature of claim 1 can be found in the specification at page 13, lines 7-14 and Fig. 3 of the original specification in which Fig. 3 shows the holder member 15 clamping the annular bulk member 47 apart from (and without clamping) the porous metal plate 37. For at least these reasons, favorable reconsideration of the rejection is respectfully requested.

Rejection of claims 1-5, 7-15, 17-19, and 21-24 based on Dristy

Claims 1-5, 7-15, 17-19, and 21-24 are rejected under 35 U.S.C. 102(b) as allegedly being unpatentable over U.S. Patent 6,368,740 (“Dristy”). For at least the following reasons, this rejection is traversed.

Claim 1 recites, among other things, a cell plate, an electroconductive gas separator, and a holder member. The cell plate is provided with: a supporting body including a porous metal plate; a cell formed on the supporting body, the cell including a solid electrolyte layer, a cathode substance layer formed on one surface of the solid electrolyte layer, and an anode substance layer formed on the other surface of the solid electrolyte layer; and an inner annular bulk metal member which is a gas impermeable member radially next to and fixed to the porous metal plate. The electroconductive gas separator cooperates with the cell plate to form

a gas passage. The holder member clamps the inner annular bulk metal member, apart from the porous metal plate.

Due to the specific structure of the invention of claim 1, the undue stress to the cell plate (including the cell and the porous substrate) during the actual usage of the fuel cell to which vibration and heat are applied can be reduced, resulting in increased reliability of the fuel cell.

Dristy does not teach or suggest the combination of features of claim 1. For example, Dristy does not teach or suggest “a holder member clamping the inner annular bulk metal member, apart from the porous metal plate.” Dristy relates to an electrochemical cell frame 21 having an integral protector portion 21. (Column 3, lines 26-41 of Dristy.) The PTO asserts that element 24 of Dristy is considered to be the holding member of claim 1. (Page 3 of the Office Action.) However, element 24 of Dristy is merely a gasket disposed between the cell frame 21’ and the hydrogen separator plate 23 (or between the cell frame 21 and the oxygen separator plate 45). (Column 3, lines 38-41 and Fig. 2 of Dristy.) The gasket 24 does not clamp the cell frame 21 or 21’ (which the PTO considers to be the inner annular bulk metal member of claim 1) apart from the screen pack 22 or 43 (which the PTO considers to be the porous metal plate of claim 1). Indeed, the cell frames 21 and 21’ are only stacked to each other but they are not clamped together. One of ordinary skill in the art would understand the term “clamping” to mean “to fasten with (or as if) with a clamp” or “to hold securely in a clamping manner.” The gasket 24 does not secure the cell frame 21 or 21’ in this manner. Thus, the gasket 24 of Dristy cannot be considered to be the holding member of claim 1. Because Dristy does not teach or suggest the holding member of claim 1, claim 1 is allowable.

Additionally, Dristy does not teach or suggest “an inner annular bulk metal member which is a gas impermeable member radially next to and fixed to the porous metal plate.” The PTO asserts that cell frame 21 or 21’ is considered to be the inner annular bulk metal member of claim 1. (Page 3 of the Office Action.) However, there is nothing to teach or suggest that the cell frames 21 and 21’ are inner annular members. Indeed, Dristy suggests the opposite, i.e., the cell frames are considered rings at the outer periphery of the cell. For example, Dristy discloses that protector rings are placed about the periphery of the cell:

For example, current technology uses protector rings to bridge the gap between the cell frame and the screen packs. The protector rings, which are typically positioned about the perimeter of the frame, function to prevent membrane extrusion and “pinching” between the frame and the screen. (Column 2, lines 26- 31 of Dristy.)

Dristy then compares the cell frame with the prior art protector rings:

A further advantage, particularly over prior art metallic protector rings, is that the present cell frame preferably comprises a non-conductive material, e.g. plastic or another non-conductive material. The prior art metallic protector rings could induce electrolysis outside of the cell active area, causing accelerated degradation of the cell, while the present integral protector lip inhibits electrolysis outside of the cell active area. (Column 5, lines 43-50 of Dristy.)

Because the cell frame of Dristy is compared to protector rings positioned about the perimeter of the cell, it is clear the cell frames 21 and 21' are at the outer periphery and are not inner annular members. Because Dristy does not teach or suggest the inner annular bulk metal member of claim 1, claim 1 is allowable.

Claims 2-5, 7-15, 17-19, and 21-24 depend from and contain all the features of claim 1, and are allowable for the same reasons as claim 1, without regard to the further patentable features contained therein.

For example, Dristy does not teach or suggest that an insulating member is provided on the annular bulk metal member, and the annular bulk metal member and the insulating member respectively have the same thermal expansion coefficients as that of the solid electrolyte layer, as recited in claim 7. The PTO asserts that the membrane 8 of Dristy is considered to be the insulating member of claim 7 (page 3 of the Office Action) but the membrane 8 cannot be the insulating member of claim 7 because it is already considered to be the solid electrolyte layer of claim 7. (Page 3 of the Office Action.) Because Dristy does not teach or suggest the insulating member of claim 7, claim 7 is allowable.

Dristy does not teach or suggest a holder member that includes a first member arranged at one side of the cell plate and having electroconductivity, a second member arranged at the other side of the cell plate and having electroconductivity, and an electrically insulative material joining the first member to the second member, as recited in claim 13. The gasket 24 (which the PTO considers to be the holding member) does not have three

members in which two are electroconductive and one is insulative. Because Dristy does not teach or suggest these features, claim 13 is allowable.

Dristy does not teach or suggest that mutual contacting areas of the holder member, gas separator and cell plate are formed into mirror surfaces, respectively, as recited in claim 17. The gasket 24 (which the PTO considers to be the holding member) is not disclosed to have a mirror surface. Because Dristy does not teach or suggest these features, claim 17 is allowable.

For at least these reasons, favorable reconsideration of the rejection is respectfully requested.

Rejection of claim 16 based on Dristy and Bossel

Claim 16 is rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over Dristy and U.S. Patent 6,344,290 ("Bossel"). Claim 16 depends from and contains all the features of claim 1. As previously mentioned, Dristy does not teach or suggest an inner annular bulk metal member which is a gas impermeable member radially next to and fixed to the porous metal plate or a holder member clamping the inner annular bulk metal member, apart from the porous metal plate.

Bossel does not cure the deficiencies of Dristy because Bossel does not teach or suggest "an inner annular bulk metal member which is a gas impermeable member radially next to and fixed to the porous metal plate." Bossel relates to a fuel cell stack with solid electrolytes. The electric power generating elements of Bossel (each including an electrolyte 17, a cathode 18 and an anode 19 formed on a gas-permeable substrate 2) are stacked alternately with respective separating plates 1 spanning between an end plate 29 and an initial plate 30. (Fig. 6 of Bossel.) However, the fuel cell stack of Bossel is held via the gas-permeable substrates 2 by respective annular seals 23 at the central portion and via the electric power elements by the separating plates 1 between the end plate 29 and the initial plate 30 and with the aid of the plate springs 31 and the helical spring 32. Bossel does not include an inner annular bulk metal member which is a gas impermeable member and disposed to be radially next to and fixed to the gas permeable substrate 2 (which the PTO equates with the porous metal plate). Because neither Dristy nor Bossel teach or suggest

the inner annular bulk metal member of claim 1, claim 1 and its dependent claim 16 are allowable.

Furthermore, Bossel does not cure the deficiencies of Dristy because Bossel does not teach or suggest “a holder member clamping the inner annular bulk metal member apart from the porous metal plate.” The contact 22 of Bossel (which the PTO equates with the holding member) does not clamp an annular bulk metal member (which Bossel does not even teach) without clamping the gas permeable substrate 2 (which the PTO equates with the porous metal plate). Indeed, the contact region 22 of Bossel is merely the two separating plates 1 and 20 of Bossel being formed in such a way as to contact each other at a non-central aperture 6. (Column 6, lines 55-59 and Figs. 1A and 2 of Bossel.) In other words, the contact region 22 is not a separate element from the separating plate 1 (which the PTO equates with the cell plate) and the separating plate 20 (which the PTO equates with the electroconductive gas separator). (Column 6, lines 55-59 of Bossel.) Because the contact region 22 is not a separate element from the separating plate 1 and the separating plate 20, it cannot be considered to be the holding member of claim 1. Because neither Dristy nor Bossel teaches or suggests the holder member of claim 1, claim 1 and its dependent claim 16 are allowable.

Furthermore, the proposed modification of Dristy based on the teachings of Bossel is improper. The PTO considers the gasket 24 of Dristy to be the holding member of claim 1. (Page 3 of the Office Action.) The PTO proposes to modify this gasket 24 so that it is the same material as separator plate 23 or 45 (which the PTO considers to be the gas separator of claim 1). If this modification is performed, the gaskets cease being gaskets for sealing, thus making the gaskets unsuitable for their intended purpose. MPEP 2143.01 states that “[i]f proposed modification would render the prior art invention being modified unsatisfactory for its intended purpose, then there is no suggestion or motivation to make the proposed modification. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).” Because the proposed modification makes the gaskets 24 of Dristy unsuitable for its intended purpose, such a modification is non-obvious, and a rejection based on such a modification is improper. Accordingly, the rejection of claim 16 is improper, and claim 16 is allowable.

For at least these reasons, favorable reconsideration of the rejection is respectfully requested.

Rejection of claims 1 and 20 based on Dristy and Edlund

Claims 1 and 20 are rejected under 35 U.S.C. 103(a) as allegedly being unpatentable over U.S. Patent 5,645,626 ("Edlund") and Dristy. For at least the following reasons, this rejection is traversed.

Claim 1 recites, among other things, a cell plate, an electroconductive gas separator, and a holder member. The cell plate is provided with: a supporting body including a porous metal plate; a cell formed on the supporting body, the cell including a solid electrolyte layer, a cathode substance layer formed on one surface of the solid electrolyte layer, and an anode substance layer formed on the other surface of the solid electrolyte layer; and an inner annular bulk metal member which is a gas impermeable member radially next to and fixed to the porous metal plate. The electroconductive gas separator cooperates with the cell plate to form a gas passage. The holder member clamps the inner annular bulk metal member, apart from the porous metal plate.

No combination of Edlund and Dristy teaches or suggests all the features of claim 1. Edlund relates to a composite hydrogen separator element and module. As shown in Fig. 3a of Edlund, in the separation element 20, the coating metal member 30 is layered to the support matrix 31 through the intermediate, layer 32. Also, the two pairs of the metal spacers 33 are disposed at the outer peripheral portion of the separation element 20 and the peripheral portion of the central hole 21. (Figs. 2a and 3a of Edlund.) One pair of the metal spacers 33 disposed at the outer peripheral portion of the separation element 20 and the other pair of the metal spacers 33 disposed at the peripheral portion of the central hole 21 are layered on the support matrix 31. (Fig. 3a and column 7, lines 51-60 of Edlund.) However, Edlund does not disclose the holding member of claim 1 (as pointed out on page 6 of the Office Action) or a cell including a solid electrolyte layer, a cathode substance layer formed on one surface of the solid electrolyte layer, and an anode substance layer formed on the other surface of the solid electrolyte layer in the relation to the supporting body and the inner annular bulk metal member as specified in claim 1. Dristy does not cure these deficiencies because, as previously mentioned, Dristy does not teach or suggest a holder member clamping the inner annular bulk metal member, apart from the porous metal plate. Because neither Edlund nor Dristy teaches or suggests a holder member clamping the inner annular bulk metal member, apart from the porous metal plate, claim 1 is allowable.

It appears that the PTO is asserting that one of ordinary skill in the art would modify the device of Edlund by using the gaskets 24 of Dristy in the device of Edlund because the gaskets 24 of Dristy have been considered by the PTO to be equated with the holding member of claim 1.¹ If the gaskets 24 of Dristy are incorporated into Edlund (a point that Applicants do not concede), the proposed combination would not have a cell including a solid electrolyte layer, a cathode substance layer formed on one surface of the solid electrolyte layer, and an anode substance layer formed on the other surface of the solid electrolyte layer in the relation to the supporting body and the inner annular bulk metal member as specified in claim 1 because Edlund does not teach such a cell. Also, as previously mentioned, the gaskets 24 of Dristy cannot be considered to be the holding member of claim 1 so the proposed combination does not have this element either. Thus, claim 1 is allowable over Edlund and Dristy.

If the PTO is asserting that one of ordinary skill in the art would modify the device of Edlund by using the protection portions of the cell frames 21 and 21' of Dristy in the device of Edlund, the proposed combination also would still not have the holding member of claim 1 or a cell including a solid electrolyte layer, a cathode substance layer formed on one surface of the solid electrolyte layer, and an anode substance layer formed on the other surface of the solid electrolyte layer in the relation to the supporting body and the inner annular bulk metal member as specified in claim 1 because Edlund does not teach such a cell. Thus, claim 1 is allowable over Edlund and Dristy.

Claim 20 depends from and contains all the features of claim 1, and are allowable for the same reasons as claim 1, without regard to the further patentable features contained therein.

For at least these reasons, favorable reconsideration of the rejection is respectfully requested.

Conclusion

Applicants believe that the present application is now in condition for allowance. Favorable reconsideration of the application as amended is respectfully requested.

¹ In what manner the gasket 24 of Dristy is to be added is unknown, and it is respectfully requested that the PTO further explain the nature of the modification.


The Examiner is invited to contact the undersigned by telephone if it is felt that a telephone interview would advance the prosecution of the present application.

The Commissioner is hereby authorized to charge any additional fees which may be required regarding this application under 37 C.F.R. §§ 1.16-1.17, or credit any overpayment, to Deposit Account No. 19-0741. Should no proper payment be enclosed herewith, as by a check being in the wrong amount, unsigned, post-dated, otherwise improper or informal or even entirely missing or a credit card payment form being unsigned, providing incorrect information resulting in a rejected credit card transaction, or even entirely missing, the Commissioner is authorized to charge the unpaid amount to Deposit Account No. 19-0741. If any extensions of time are needed for timely acceptance of papers submitted herewith, Applicants hereby petition for such extension under 37 C.F.R. § 1.136 and authorize payment of any such extensions fees to Deposit Account No. 19-0741.

Respectfully submitted,

Date 3/18/2010

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